Service Manual
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Rev. 1 Date

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• This service manual has been specially prepared to provide all the necessary information for the proper maintenance and servicing of VENTO Zip r3i Scooter.

This manual contains an introductory description on VENTO Zip r3i and procedures for Inspection/Service and overhaul of its main components. This Manual is intended those who have enough knowledge and skills for servicing of VENTO vehicles. Without such knowledge and skills you should not attempt servicing by relying on this manual only. Instead, please contact your nearly authorized VENTO motorcycle dealer.
CHAPTER 1
1-1 GENERAL INFORMATION

TYPE & IDENTIFICATION
FRAME NUMBER
FRAME NUMBER is Engraving on the steel tube of frame as shown in figure.

ENGINE NUMBER
ENGINE NUMBER is Engraving on rear side
Crankcase Shown figure.
Both FRAME NUBER AND ENGINE NUMBER are designed
Specially for registration your scooter and for spare part Orders.

FUEL AND ENGINE OIL RECOMMENDATION
Be sure to use specified fuel and engine oil.
Some specifications are as follows:

FUEL
• Gasoline should be Unleaded, the octane number must be 85 ~95 or more.

ENGINE OIL
• For engine lubrication, you can use specified high quality two-stroke engine oil (without
being diluted).
• GEAR OIL
  Use high quality, all-purpose SAE10W/40 Gear oil for this scooter. Make sure that the Engine
  oil/Gear oil what you are using should come under API classification.

BREAK-IN PROCEDURES
During manufacture only the best possible materials are used and all machined parts are finished
to a very high standard but it is still necessary to allow the moving parts to “BREK-IN” before
subjecting the engine to maximum stresses. The future performance and reliability of the engine
depends on the care and restraint during its early life.

General requirements are as follows

• Limit break-in speed
  At the first 1000 ms (630 miles mileage use throttle opening less than 1/2.
  Up to 1600 Kms 1000 miles mileage use throttle opening less than 3/4.
• Upon reaching an odometer reading of 1600 kms (1000 miles) you can subject the motorcycle
to full throttle operation.
• Do not maintain constant engine speed for on extended time period during any portion of the
“BREAK-IN” period, try to vary the throttle position.
GENERAL PRECAUTIONS:

**WARNING**

- Proper service and repair procedures are important for the safety of the service mechanic and the reliability of the vehicle.
- When two or more persons are working together, pay attention to the safety of each other.
- When it is necessary to run the engine indoors, make sure that the exhaust gas is forced outwards and ventilation should be proper.
- When working with toxic or flammable materials, make sure that the area you work in is well ventilated and that you follow all of the material manufacturer’s instructions.
- Don’t use gasoline as a cleaning agent.
- After servicing the motorcycle check all lines i.e. fuel, oil, and brake lines for leaks.
- Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, cotter pins, circlips, and certain other parts as specified, are sure to replace them with ones. Also before installing these new parts be sure to remove any left out material from the mating surfaces.
- Never reuse a circlip, when installing a new circlip, take care not to expand the end gap larger than required to slip the circlip the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.
- Do not use self-locking nuts a few times over.
- If parts replacement is necessary, replace the parts with VENTO Genuine parts or their equivalent.
- When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstall in proper order and orientation.
- Always use special tools when required.
- Always use specified lubricant, bond & sealant.
- While removing the battery, disconnect the Negative terminal / Cable first then Positive terminal / Cable and when reconnecting the battery, connect the Positive terminal / Cable first then Negative terminal / Cable.
- During Service to electrical parts, if no need of battery power then, please disconnect the Negative terminal / Cable of the battery.
- During tightening of cylinder head and crank case bolts and nuts start with larger diameter and ending with smaller diameter, from inside to outside diagonally, with the specified tightening torque values.
- After reassembly, recheck parts for tightness and operation.

**REPLACEMENT COMPONENTS**

Be sure to use genuine VENTO spare parts or their equivalent. Genuine VENTO components are high quality parts, which are designed specially for VENTO vehicles.

**CAUTION**

Scooter/motorcycle may damage by using non-genuine parts or parts that is not equivalent to VENTO parts and will be affecting performance also.
1-3 GENERAL INFORMATION SPECIFICATIONS

DIMENSIONS AND NET WEIGHT

Overall Length.......................1620mm
Overall Width...........................625mm
Overall Height.......................1010 mm
Wheelbase..............................1170mm
Ground Clearance......................90mm
Dead Weight............................78kg

CHASSIS

Front shock absorber
Telescopic, Coil spring, without oil damped.

Rear shock absorber
Swing arm type Coil spring, with oil damped.

Steering angle
48º (toward the left/toward the right)

Front Tire size..........................3.50-10
Rear Tire size.............................3.50-10

Front brake Disc..........................φ160
Rear brake Drum............................φ110

ENGINE

Type.........................Two-stroke, Air Cooled
Intake system..................Reed valve
No. of Cylinder.........................1
Bore.........................................40.0mm
Stroke.......................................39.6mm
Displacement.............................49.8CC
Compression Ratio......................6.9:1
Carburetor..............................Side draft
Air cleaner..............Dual polyurethane foam

Starting System
Electric start & Kick pedal for Manual Start.

Lubricating System
Auto lubrication, by Oil Pump

ELECTRICAL

Ignition System.....................Electronic CDI

Ignition Timing...................15º at 5000 RPM
Spark Plug.........................NGK/R/BR8HSA
Storage Battery..................YUASA/YB4L-4
Battery Capacity...............12V-4Ah
Magneto................................AC
Fuse.................................10Amp
Headlight..............................12V 35 / 35 Watt
Turn Indicators (X4).................12V / 3 Watt
Tail light/stop light.................12V / 5Watt
Meter light................................12V / 3Watt
Oil level Indicator light............12V / 3 Watt
Tran signal Indicator light........12V / 3 Watt
High beam Indicator light.........12V / 3Watt

CAPACITY

Fuel Tank..............................5.2L
Engine Lubricating Oil Tank........1.0L
Gear Oil.......................................0.1L

TRANSMISSION

Clutch System
Dry shoe, Automatic, Centrifugal Type

Gears shifting mechanism
Automatic Primary Reduction 1

Gear Reduction ratio
The first gear...............3.692(48/13)
The second gear...........3.000(36/12)
Drive System.................V-Belt driv
## CHAPTER 2

### PERIODIC MAINTENANCE AND SERVICE

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The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Mileages are expressed in terms of Kilometer, Miles and time for your convenience.

**Note:**
More frequent servicing may be performed on motorcycles that are used under bad road condition.

### PERIODIC MAINTENANCE CHART

<table>
<thead>
<tr>
<th>Interval</th>
<th>Miles</th>
<th>Kilometer</th>
<th>Months.</th>
<th>Storage battery</th>
<th>Cylinder head nut and exhaust pipe bolt</th>
<th>Cylinder head and cylinder</th>
<th>Spark plug</th>
<th>Air cleaner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>630</td>
<td>1000</td>
<td>2</td>
<td>I</td>
<td>T</td>
<td>_</td>
<td>—</td>
<td>Inspect &amp; Clean every 3000 Kms (1890 miles)</td>
</tr>
<tr>
<td></td>
<td>3780</td>
<td>6000</td>
<td>12</td>
<td>I</td>
<td>T</td>
<td>C</td>
<td>—</td>
<td>Replace every 12000 Kms(1750 Miles)</td>
</tr>
<tr>
<td></td>
<td>7560</td>
<td>12000</td>
<td>24</td>
<td>I</td>
<td>T</td>
<td>C</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11340</td>
<td>18000</td>
<td>36</td>
<td>I</td>
<td>T</td>
<td>C</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15120</td>
<td>24000</td>
<td>48</td>
<td>I</td>
<td>T</td>
<td>C</td>
<td>R</td>
<td></td>
</tr>
</tbody>
</table>

- Inspect & Clean every 3000 Kms (1890 miles)
- Replace every 12000 Kms(1750 Miles)
- Replace every 4 years
- Replace every 2 years

**Note:**
- I=inspect clean adjust lubricate or replace if necessary;
- A=adjust C=clean R=replace T=tighten
2-2 PERIODIC MAINTENANCE PROCEDURE

BATTERY INSPECTION AND CHECKING PROCEDURE

Storage Battery

| Inspect at initially 1000Kms 630 miles 2 months and every 6000 Kms 3780 miles 12 months. |

- Open seat, and then remove the battery box cap in the middle of helmet box.

- Disconnect Negative terminal / Cable first then Positive terminal / Cable of Battery.

- Measure the voltage between the +ve and –ve terminal of Battery charge the Battery if the voltage is below the specified limit.
BATTERY TESTING PROCEDURE

Remove the battery from the Motorcycle/Scooter. Connect the battery on load tester ensuring Red lead of tester to (+ve) and Black lead to (-ve) terminal of battery. Check the terminal voltage of battery. It should be 12~14.5 Volts. Press the push button on the tester and watch the voltmeter reading on load. The battery voltage should not drop down less than 9 volts; this indicates that the battery is perfect to take load of self-starter motor. Check the specific gravity of each cell should not be less than 1.220. Put the battery on charge, if required and carry out load test.

- Diagnose the nature of failure as under:
  - BATTERY CELL DEAD TEST: On load if battery voltage is found less than 9.5 Volt and one or more cell shows specific gravity less than 1.220 then change the battery.
  - OPEN CIRCUIT: During the charging of battery does not pickup the charge. In any of the above case, replace the battery.
  - RECOMD BATTERY LOAD TESTER: MAKE—ELAK, MODEL: --BCT7
  - CAUTION: During Inspection, if the battery on the vehicle is found defective, before replacing with a new battery, it is important to check the battery charging circuit.

BATTERY CHARGING CIRCUIT TEST

The MAGNETO generated AC current, which is rectified into DC current by Voltage Regulator. It, is automatically charging the battery depending upon condition of the battery, load and engine rpm. Regulator is connected in parallel to the circuit. Hence this type of system is called "PARALLEL LOAD REGULATOR".

Connect DC Voltmeter and DC Ammeter, start the engine with fully charged good battery. The Voltage Regulator output is as follows.

- Battery charging current range in between 0.6 Amp to 2 Amp.
- The engine speed @ 5000 rpm with headlamp on condition.
- Battery terminal charging voltage > 11.5 V at any load condition (depending upon the condition of battery)

NOTE 1
Incase charging output is less than 0.6 Amp or more than 2.0 Amp then replace the Voltage Regulator with new one and recheck.

NOTE 2
AMMETER: ------Series connection inline with positive battery wire to measure DC –Amp.
VOLTMETER: ---Parallel connection between positive & negative terminal of the battery to measure DC-Volts.
# IMPORTANT TIPS ON BATTERY

<table>
<thead>
<tr>
<th>SPECIFIC GRAVITY</th>
<th>The Specific Gravity of fully charged battery should be 1.220~1.240 Use Hydrometer to check each cell of battery.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARNING</td>
<td>Remove negative terminal first, then positive terminal. If the battery is corroded by sulfur. Please exchange it. If the terminal of the battery has too much precipitate, please exchange it.</td>
</tr>
<tr>
<td>CHARGING</td>
<td>Charging is necessary at less than 1.220 Specific Gravity for old battery. It changes according to electrolyte temperature. Connect positive terminal of charger to positive battery wire &amp; negative terminal of charger to negative battery wire.</td>
</tr>
<tr>
<td>CHARGING CURRENT</td>
<td>For 2.5 Ah battery the charging current should be Maximum 0.25Amp. For 6.0 Ah battery the charging current should be Maximum 0.6Amp.</td>
</tr>
<tr>
<td>CHARGING TIME</td>
<td>For new battery 8-12 hrs. For old battery 12-14 hrs.</td>
</tr>
<tr>
<td>WARNING</td>
<td>Always open all the caps of battery before charging. Keep flames &amp; sparks away from the battery. Turn ON or OFF Switch at charger &amp; not at battery terminal Don't charge the battery, if electrolyte temperature is more than 45ºC. Do not quick charge the battery.</td>
</tr>
<tr>
<td>INSTALLATION</td>
<td>Connect positive terminal first, then negative terminal.</td>
</tr>
<tr>
<td>BATTERY CAPACITY</td>
<td>12Volt- 6Ah YTX7A-BS/YUASA</td>
</tr>
<tr>
<td>RECOMMENDED BATTERY CHARGER</td>
<td>Make: ELAK Model C1/48</td>
</tr>
<tr>
<td>RECOMMENDED HYDROMETER</td>
<td>Make: THIMSON Model: 108</td>
</tr>
<tr>
<td>NOTE</td>
<td>- Always top up battery with the distilled water up to the maximum level (Never use Acid to top up the old battery). - Always ensure new battery is being charged in cold condition after filling with the electrolyte. - Always ensure that battery breather tube is not clogged, crimped or bent. Breather tube should be properly routed. - <em>Incase if Motorcycle/ Scooter is not being used for longer period, then first charge the battery fully &amp; then connect only positive terminal to Motorcycle/</em></td>
</tr>
</tbody>
</table>
2-3 PERIODIC MAINTENANCE AND ADJUSTMENT PROCEDURE

**Cylinder head nuts and exhaust pipe bolts**

<table>
<thead>
<tr>
<th>Cylinder head nut</th>
<th>Exhaust pipe bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-18N.m</td>
<td>15-18N.m</td>
</tr>
</tbody>
</table>

If cylinder head nuts are not tightened to the specified torque, may result in leakage of compressed fuel-air mixture and reduce output, tighten the cylinder head nuts in the following procedures:

1. Remove the frame lower covers.
2. Remove the cylinder head cover bolt.
3. Remove spark plug Suppressor cap.
4. Tighten the nuts evenly one by one to the specified torque. Tighten the nuts in the Specified order.

**Tightening Torque**

**Cylinder and cylinder head**

Remove carbon every 6000 km 3780 miles or 12 months.

Carbon deposits in the combustion chamber and the cylinder head will raise the compression ratio and may cause preignition and overheating. Carbon deposition at the exhaust port of the cylinder will prevent the flow of exhaust gases, reducing the output. Remove carbon deposits periodically as per specified schedule.
2-4 PERIODIC MAINTENANCE AND ADJUSTMENTS PROCEDURE

SPARK PLUG
Neglecting the spark plug maintenance eventually leads to difficult starting and poor performance. If the spark plug is used for a long time, the electrode gradually burns away and carbon builds up along the inside part. In accordance with the periodic table, the plug should be removed for inspection, cleaning and to reset the gap.

Carbon deposits on the spark plug will prevent good sparking and cause misfiring. Clean the carbon deposits periodically.

CARBON DEPOSIT

Check to see the carbon deposit on the Spark Plug. If the carbon is deposited, remove it with a spark plug cleaner machine or carefully using a tool with a pointed end.

Check to see the worn out or burnt condition of the electrodes. If it is extremely worn or burnt, replace the plug and also replace the plug if it has a broken insulator, damaged thread etc.

Thickness gauge
Spark plug gap 0.6~0.7 mm (0.024-0.028 inch)
Check the spark plug for burnt condition. If abnormal replace the
Tighten the spark plug to the specified torque.

Spark Plug
Tightening torque: 15-18 N.m

NOTE:
- To check the spark plug, first make sure that the fuel used is unleaded gasoline.
- Confirm the Specification thread send and reach while replacing the spark plug.
AIR CLEANER:

| Clean every 3000 Kms 1890 miles Replace every 12000 Kms (1750 Miles) |

If the air cleaner is clogged with dust, Air Intake resistance will be increased with a result decrease in power output and will be increase in fuel consumption. Check and clean the filter element in the following manner.

Remove clamp and screw take out air cleaner
- Unscrew tapping screw remove air cleaner cover washing pan of a proper size with Fill a Non-flammable cleaning solvent. Put the air
- Cleaner element in the cleaning solvent and wash properly.
- Squeeze the cleaning solvent out of the washed element
- By pressing it between the palms of both hands: do not twist or wring the air cleaner element or it will develop tears.
- Immerse cleaned filter element in CCI or CCI Super oil and
- Squeeze the oil out of the element leaving it slightly wet
- With oil. Fit the element to the Air cleaner case properly
- Install Air cleaner in the reverse order of removal.

CAUTION
Before and during the cleaning operation, inspect the core for tears. A torn filter element must be replaced with new one.

Be sure to position the filter element snugly and correctly, so that no incoming air will bypass it. Remember, rapid wear of piston rings and cylinder bore is often caused by a defective or poorly fitted filter element.

A- Non-flammable cleaning solvent (Kerosene)
B- CCI OR CCI Super oil or SAE 80 or 90 Gear oil.
THROTTLE CABLE

Adjust at initially 1000Kms 630 miles or after 2 months. And after every 6000 Kms 3780 miles or after 12 months.

Loosen locknut and adjust throttle cable play by turning adjuster in or out to obtain the following cable play. After adjusting the cable Play tightens the locknut.
Cable plays 0.5-1.0MM 0.02-.0.040 inch

ENGINE IDLE SPEED

Adjust at initially 1000Kms 630 miles or after 2 months and Every 6000 kms (3780 miles or after 12 months thereafter.

- Adjust the throttle cable play.
- warm up the engine at normal running condition

NOTE:
A warm engine means an engine that has been run for 10 minutes.

- Connect an Digital Tachometer to the connecting portion of the magneto lead wire as shown
- In the illustration. Use the selector key “C” position.

Adjust the Idling Screw @ to obtain the Idling RPM as follows:

Idling Speed 1800±100 RPM

Finally adjust the throttle cable play.

FUEL LINE

Inspect at initially 1000 km 630 miles or after 2 months) and Every 6000 km (3780 miles or after 12 months), replace after every 4 years.
2-6 PERIODIC MAINTENANCE PROCEDURE

**OIL PUMP:**

| Inspect at Initially 1000 Kms 630 miles 2 months and every 6000 kms 3780 miles or 12 months there after. |

The oil pump to the engine feeds the engine oil. The amount of oil fed to it is regulated by engine speed and oil pump control lever, which is controlled by amount of throttle opening. Check the oil pump in the following manner to confirm correct operation for Throttle valve full opening position.

- Turn the throttle grip full open.
- Check whether mark on the oil pump control lever
- Is aligned with the index mark when the throttle valve is positioned as above.
- If the marks are not aligned, loosen lock nuts and turn the adjuster in or out to align the marks.
- After align the marks, tighten the locknuts.

**Caution**

Oil pump cable adjustment must be done after throttle cable adjustment.
2-7 PERIODIC MAINTENANCE PROCEDURE

GEAR OIL:
Inspect at initially 1000 km 600 miles or 2 months and every 6000 km 3780 miles or 12 months thereafter.

- Inspect gear oil periodically as follows:
- Remove the cover and hose.
- Remove the kick-start lever.
- Remove clutch cover
- Remove oil level bolt and inspect oil level, if oil level is below the oil hole level, Add oil until oil flows from the level hole.
- Tighten oil level bolt to the specified torque.

Tightening torque
9-15N.m(0.9-1.5 kg-m)

BRAKE:
Inspect at initially 1000 km 600 miles 2 months and every 6000 km 4000 miles 12 months thereafter, replace brake fluid after every 2 years, replace brake hose after every 4 years.

Front brake fluid level
- Keep the scooter upright and place the handlebar straight.
- Check brake fluid level by observing the lower limit line
- On the brake fluid reservoir.
- When the level is below the lower limit line, replenish with Brake fluid that meets the following specification.

Specification and classification DOT 3 or DOT4

WARNING
The brake system of this scooter is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based. Do not use any brake fluid taken from old, used or unsealed containers. Never re-use the brake fluid left over from the last servicing or stored for long periods.

WARNING
Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses joints for cracks and oil leakage before riding.
2-8 PERIODIC MAINTENANCE PROCEDURE

BRAKE PADS (FRONT BRAKE)
Observing the limit can check the Wear condition of brake pads
Line marked on the pad. When the wear exceeds the limit mark, replace
the pads with new ones.

CAUTION:
Replace the brake pad as a set, otherwise braking efficiency will be
Adversely affected.

AIR BLEEDING FORM THE BRAKE FLUID CIRCUIT (FRONT BRAKE)

Air trapped in the fluid circuit acts like a cushion to absorb a large
proportion of the pressure developed by the master cylinder and thus
interferes with the full braking performance of the brake caliper. The
presence of air is indicated by “sponginess” of the brake lever and
also by lack of braking force. Considering the danger to which such
trapped air exposes the machine and rider, it is essential that, after
remounting the brake and restoring the brake system to the normal
condition, the brake fluid circuit be purged of air in the following manner:

Fill up the master cylinder reservoir to the upper end of the inspection
Window. Replace the reservoir cap to prevent entry of dirt.
Attach a pipe to the caliper bleeder valve, and insert the free end of the pipe into a receptacle.
Bleed air from the bleeder valve.
Squeeze and release the brake lever several times in rapid succession. And squeeze the lever fully
without releasing it. Loosen the bleeder valve by turning it a quarter of a turn so that the brake fluid
runs into the receptacles: this will remove the tension of the brake lever causing it to touch the
handlebar grip. Then, close the valve, pump and squeeze the lever, and open the valve. Repeat this
process until the fluid flowing into the receptacle no longer contains air bubbles.

NOTE
When bleeding the braking system, replenish the brake fluid reservoir if necessary. Make sure that there
is always some fluid visible in the reservoir.

- Close the bleeder valve, disconnect the pipe. Fill the reservoir with specified brake fluid to the
  UPPER end of the inspection window.

TIGHTENING TORQUE BLEEDER VALVE: 6-9N.m (0.6-0.9kg-m, 4.5-6.5lb-ft)

CAUTION
Handle brake fluid with care: The brake fluid reacts chemically with paint, plastics, and rubber
materials, etc.
2-9 PERIODIC MAINTENANCE AND ADJUSTMENT PROCEDURE:

BRAKE LEVER PLAY (REAR BRAKE):
Turn adjusting nut 2 so that the play @ of Brake Lever is 15-25mm (0.6~0.8) as shown.

BRAKE SHOE WEAR:
This vehicle is equipped with the brake lining limit Indicator on the rear brake. Inspect brake lining limit as follows:

- First check if the brake system is properly Adjusted.
- When operating the brake, check to see that the tip of indicator is within the range.
- If the tip of indicator is beyond the range, the brake shoe assembly should be replaced with a new set of shoes.
**TIRE**

**Inspect at initially 1000Kms 630 miles 2 months and every 6000KM 3780 miles 12 months thereafter.**

*Tire pressure*

If the tire pressure is too high, the steering will be adversely affected and tire wear increased. Conversely, if tire pressure is too low, stability will be adversely affected. Therefore, maintain the correct tire pressure for good drivability and to prolong tire life.

**CAUTION:**
The standard tire fitted on the scooter is 3.50-10 for front and rear. The use of other than standard may cause handling instability. It is highly recommended to use genuine tire.

*Tire treads condition*

Operating the scooter with the excessively worn tires will decrease riding stability and consequently invite dangerous situation. It is highly recommended to replace the tire when the remaining depth of tire tread reaches the following specification.

Tire Tread depth limit: 1.6 mm 0.064 Inch
- [Use Tire depth gauge](#)

**STEERING**

**Inspect at initially 1000 kms 630 miles 2 months and every 6000 kms (3780 miles) thereafter.**

Steering should be adjusted properly for smooth turning of handlebars and safe running. Over tight steering prevents smooth turning of handlebars and too loose steering will cause poor stability. Check that there is no play in the front fork assembly by supporting the machine so that the front wheel is off the ground, with wheel straight ahead, grasp lower shock absorber near the axle and pull forward. If play is found, perform steering bearing adjustment.
**FRONT FORK:**
Inspect & Adjust at initially 1000 kms 630 miles 2 months and every 6000 km 3780 miles 12 months thereafter.

Inspect the front shock absorber for oil leakage or other damage, and replace the defective parts, if necessary.

**REAR SHOCK ABSORBER:**
Inspect & Adjust at initially 1000 kms 630 miles 2 months and every 6000 km 3780 miles 12 months thereafter.

Inspect the rear shock absorber for oil leakage and mounting rubbers including engine mounting for wear and damage, and replace the defective parts, if necessary.

**CHASSIS BOLTS AND NUTS:**
Inspect & Adjust at initially 1000 kms 630 miles 2 months and every 6000 km 3780 miles 12 months thereafter.

*These bolts and nuts listed below are important safety components. They must be tightened to the specified torque.*

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>N·m</th>
<th>Kg-m</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front axle nut</td>
<td>37-44</td>
<td>3.7-4.4</td>
</tr>
<tr>
<td>2</td>
<td>Steering stem locknut</td>
<td>37-44</td>
<td>3.7-4.4</td>
</tr>
<tr>
<td>3</td>
<td>Handlebar tightening nut</td>
<td>37-44</td>
<td>3.7-4.4</td>
</tr>
<tr>
<td>4</td>
<td>Handlebar positioning bolt</td>
<td>37-44</td>
<td>3.7-4.4</td>
</tr>
<tr>
<td>5</td>
<td>Brake hose tightening bolt</td>
<td>22-29</td>
<td>2.2-2.9</td>
</tr>
<tr>
<td>6</td>
<td>Brake master cylinder tightening nut</td>
<td>22-29</td>
<td>2.2-2.9</td>
</tr>
<tr>
<td>7</td>
<td>Brake caliper tightening bolt</td>
<td>22-29</td>
<td>2.2-2.9</td>
</tr>
<tr>
<td>8</td>
<td>Rear wheel tightening nut</td>
<td>85-98</td>
<td>8.5-9.8</td>
</tr>
<tr>
<td>9</td>
<td>Rear shock absorber upper tightening bolt</td>
<td>37-44</td>
<td>3.7-4.4</td>
</tr>
<tr>
<td>10</td>
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<td>37-44</td>
<td>3.7-4.4</td>
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</table>
LUBRICATION:

Proper lubrication is important for smooth operation and long life of each working part of the scooter. The major lubrication points are indicated below:

**NOTE**
- Lubricate exposed parts, which are subject to rust with a rust preventive spray whenever the motorcycle has been operated under wet or rainy condition.
- Before lubricating each part, clean off any rusty spots and wipe off any grease, oil dirt of grime.

**WARNING**

Be careful not to apply too much grease to the rear brake camshaft. If grease gets on the linings, brake slippage will result.

- Steering stem bearing
- Front wheel bearing
- Engine bracket
- Rear brake camshaft
- Side stand
- Rear brake shaft and rear brake cable
- Speedometer cable and gear box
  - Main stand
  - Throttle retainer and throttle Cable.

*A-USE GREASE.  
B-USE ENGINE OIL.*
COMPRESSION PRESSURE CHECK

The compression of the cylinder is a good indicator of its internal condition. The decision to overhaul the cylinder is often based on the results of a Compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance.

COMPRESSION PRESSURE SPECIFICATION

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>LIMIT</th>
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<tbody>
<tr>
<td>1400 Kpa (14Kg/Cm², 198psi)</td>
<td>980 Kpa (9.8Kg/Cm², 139psi)</td>
</tr>
</tbody>
</table>

LOW COMPRESSION PRESSURE CAN INDICATE ANY OF THE FOLLOWING CONDITIONS:

- Excessive worn cylinder wall.
- Worn-down piston or piston rings.
- Piston rings stuck in grooves.
- Ruptured or otherwise defective cylinder head gasket.

COMPRESSION PRESSURE TESTING PROCEDURE

NOTE:

- Before testing the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque values.
- Have the engine warmed up idling before testing.
- Be sure that the battery used is in fully charged condition.

Remove the parts concerned and test the compression pressure in the following manner.

- Support the motorcycle with the center stand.
- Remove the Suppressor cap.
- Remove the spark plug.
- Fit the Compression gauge in plug hole, while taking care that the connection tight.
- Keep the throttle grip in full open position.
- While cranking the engine a few seconds with the starter, and record the maximum gauge reading as the compression of that cylinder.
AUTOMATIC CLUTCH INSPECTION

This VENTO Zip r3i is equipped with an automatic clutch and variable ratio belt drive transmission. The engagement of the clutch is governed by engine RPM and centrifugal mechanism located in the clutch. To ensure proper performance and longer lifetime of the clutch assembly it is essential that the clutch engagement smoothly and gradually.

The following inspection must be done:

1. INITIAL ENGAGEMENT INSPECTION:
   - Warm up the engine to its normal running temperature.
   - Connect the digital tachometer.
   - Seated on the motorcycle on the level ground, increase the engine RPM slowly and note the RPM at which the motorcycle begins to move forward.

   **ENGAGEMENT RPM: 2700~3100 RPM**

2. CLUTCH LOCK-UP INSPECTION:
   Perform this inspection to determine if the clutch is engagement and not slipping.
   - Apply the rear brake as firm as possible.
   - Briefly open the throttle fully and note the maximum engine RPM.
   - Sustained during the test cycle.

   **LOCK-UP RPM: 4100~4900**

Do not apply full power for more than 3 seconds, damage may occur to the clutch or engine.
### CHAPTER 3
### ENGINE

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</table>
The parts listed below can be removed and reinstalled without removing the engine from the frame.

Engine left side
Kick starter lever
Clutch cover
Kick starter shaft
Kick driven gear
Fixed drive fan
Fixed drive gear
V-belt
Movable drive face
Starter driven gear
Starter drive gear
Clutch housing
Gear case cover
Transmission gear
Clutch shoe

Engine center
Intake pipe
Reed valve
Oil pump
Oil pump gear
Cylinder head
Cylinder
Piston

Engine right side
Cooling fan
Magneto
Starter motor
Engine removal and reinstallation

Engine removal

Remove ignition coil
Remove muffler
Remove cylinder cover
Remove cooling fan cover
Remove cooling fan

Remove magneto rotor nut.

Remove the magneto rotor.

Remove magneto rotor and key.

Remove oil pump and retainer.
Remove oil pump gear.

Remove cylinder head and cylinder.

Place a cloth stopper below the piston and
Remove the circlip with pliers.

Remove the piston pin and piston.

Remove the kick-starter lever.

Remove clutch cover

Remove the kick-starter shaft spring and
Kick starter shaft.
Remove the retainer after removing the screws.
Remove spring, gasket and kick starter gear.

Remove the kick-starter nut with the special tool.

*Caution:* The nut has counter-clockwise thread.

Remove fan and v-belt.
Disassemble the movable drive face.
Remove the kick-starter shaft.

Remove starter idle gear cap and starter pinion.
Remove starter motor.

Remove the clutch housing with the special tool.
Drain gear oil.

Remove gear case cover.

Remove starter shaft.

Remove the circlip and final driven gear.
Remove the idle gear shaft assay.

Remove the rear axle nut.
Remove the rear wheel.

Remove brake shoes and rear axle shaft.

Remove the rear brake cam lever indicator plate and camshaft.

Remove spring
Remove cotter pin and shaft
Remove main stand

Remove crankcase securing screws
Disassemble crankcase with a special tool.

Remove crankcase.

Loosen the clutch shoe nut.

Remove the nut while holding down clutch Shoe assembly with both hands (as shown).
Warning: Gradually back off the clutch shoe assembly pressed down by hands to reduce the clutch-sparing load.

Releasing your hand suddenly may cause damage to the following parts.

Clutch shoe nut
Clutch shoe assembly
Springs

Caution: Do not attempt to disassemble the clutch shoe assy. Otherwise the clutch shoe may be damaged. Remove the movable driven face seat with a thin bared screwdriver.

Remove the pins, movable driven face and fixed driven face.

Remove circlip

Remove bearing with special tool.

Caution: Replace the removed bearing with a new one.

Remove bearing with special tool.

Remove the spacer

Remove the oil seal from the gear case cover with the special tool.
Caution: Replace the removed oil seal.

Remove the bearing with special tool.

Caution: Replace the removed bearing with a new one.

Removing the bearings with special tools.

Remove the bearing retainer.

Remove oil seal with the special tools.

Caution: Replace the removed oil seal with a new one.

Remove the bearing with special tooling.

Caution: Replace removed bearing with a new one.

Remove the drive shaft bearing and idle shaft bearing.

Caution: The removed bearings should be replaced with new ones.
Remove the right crankshaft oil seal with special tool.

_Caution:_ The removed oil seal should be replaced with a new one.

Remove the right crankshaft bearing with the special tool.

_Caution:_ The removed bearing should be replace with a new one.

Remove the left crankshaft bearing.

_Caution:_ the removed bearing should be replaced.

_Bushing inspection:_
Inspect the bushing for wear or damage.
If any defects are found, replace the bushing.

_Crankcase bushing disassembly_

Use two steel tubes of appropriate size to press the engine mounting bushings on a vise as shown in the illustrations.
Bearing:
Clear bearing with solvent and lubricate
With engine oil before inspection.
Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase. Replace the bearing if there is anything unusual.

Damage to the lip of the oil seal may result in leakage of the fuel-air mixture or oil. Inspect for damage and be sure to replace seal if found.

Crankshaft:
Crankshafts run out:
Support the crankshaft with "V" blocks as shown, with the two end journals resting on the blocks.
Position the dial gauge, as shown, and rotate the crankshaft to read the run out as shown.
Correct or replace the crankshaft if the run out is greater than the specified limit.

| Service limit: | 0.05mm (0.002 in) |

Excessive crankshaft run out is often responsible for abnormal engine vibration. Such vibration reduces the engine life.
CONROD DEFLECTION AND CONROD BIG END SIDE CLEARANCE

Turn the crankshaft with the connecting rod to feel the smoothness of rotary motion in the big end. Move the rod up and down while holding the crankshaft rigidly to be sure that there is no rattle in the big end. Wear on the big end of the connecting rod can be estimated by checking the movement of the small end of the con rod. The method can also check the extent of wear on the parts of the connecting rod's big end. If wear exceeds the limit, replace connecting rod, crank pin and crank pin bearing.

Service limit 3.0mm (0.12in)
Instruments: 1. dial gauge (1/100 mm)
2. V block and
3. Thickness gauge

Push the big end of the conrod to one side and measure the side clearance with the thickness gauge.
Standard: 0.10~0.45 mm (0.004~0.018 in)
Service limit: 1.00mm (0.039 in)

Connecting rod small end i.d.:
Measure the connecting rod small end diameter with a caliper gauge.
Service limit 14.040mm

Clutch shoe inspection:
If the engine rpm doesn't coincide with the specified rpm range, then disassemble and inspect the clutch.
Clutch shoe:
Inspect the shoes visually for chips, cracking, uneven wear and burning, and check the thickness of the shoes with vernier calipers. If the thickness is less than the following service limit, replace the complete assembly as a set.
Service limit: 2.0mm (0.08 in)
Clutch housing inspection:

Clutch springs:
Visually inspect the clutch springs for stretched coils or broken spring coils.

Caution: Clutch shoes or springs must be changed as a set and never separately.
Clutch housing inspection:
Inspect visually the condition of the inner surface of clutch housing, for deep scratches or uneven wear or discoloration caused by burning. Measure the clutch housing inside diameter with inside calipers. Measure the diameter at several points to check for an out-of-round condition as well as wear. If any defects are found or measurement exceeds the specified limit, replace the clutch housing with new one.

Service limit: 110.50mm (4.350in)

Drive belt inspection:
Remove the drive belt and check for cracks, abnormal wear and separation or contamination with oil. Measure the drive belt width with vernier calipers. Replace it if the belt width is less than the service limit or and defect has been found.

Service limit 16.0mm (0.630in)

Caution: Always keep the drive belt away from any greasy material.

Movable driven face inspection:
Inspect the belt contact surface of the drive face for wear, scratches or any abnormality. If there is something unusual, replace the drive face with a new one.

Roller and sliding surface inspection:
Inspect each roller and sliding surface for wear or damage. Measure the diameter of Roller with vernier calipers. If any defects are found or measurement exceeds the Specified limit, replace the roller as a Complete set.
Driving face spring inspection:
Measure the free distance of the driven face spring. If the length is shorter than the service limit, replace the spring with a new one.

Service limit: 104.5mm (4.11 in)

Driven face pin and oil seal inspection:
Turn the driven face and check to see that the driven faces turn smoothly. If any stickiness or hitches are found, visually inspect the lip of oil seal, driven face sliding surface and sliding pins for wear or damage.

Driven face inspection:
Inspect the belt-contacting surface of both driven faces for any scratches, wear and damage. Replace driven face with a new one if there is any abnormality.
CHAPTER 4

Section 1.01

Section 1.02 FUEL AND LUBRICATION SYSTEM

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**FUEL SWITCH**

When turning the starter motor, a negative pressure is generated in the combustion chamber. This negative pressure draws on the fuel tap diaphragm, (through a passage way in the carburetor intake pipe) and vacuum hose. Due to this, the negative pressure increases behind the fuel tap diaphragm, until it is higher than this valve’s spring pressure. The fuel valve in the fuel is then forced to open (due to this diaphragm operation) and allows fuel to flow into the carburetor float chamber.

<table>
<thead>
<tr>
<th>CARBURETOR</th>
<th>Side Draught</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carburetor Type</td>
<td>PZ19JB</td>
</tr>
<tr>
<td>Identification code</td>
<td>19mm</td>
</tr>
<tr>
<td>Throat tube diameter</td>
<td>80</td>
</tr>
<tr>
<td>Main jet size</td>
<td>57.5</td>
</tr>
<tr>
<td>Idle needle jet size</td>
<td>3rd groove from top</td>
</tr>
<tr>
<td>Fuel needle clamp position</td>
<td>extrude $1\frac{1}{2} \pm \frac{1}{2}$ turnout</td>
</tr>
<tr>
<td>Idle air adjusting screw</td>
<td>$13\pm1$ mm</td>
</tr>
<tr>
<td>Float height</td>
<td>$3\sim6$ mm (0.1~0.2 In)</td>
</tr>
<tr>
<td>Throttle cable play</td>
<td></td>
</tr>
</tbody>
</table>
Proper carburetion is determined according to the results of various tests, mainly concerning engine power, fuel consumption and cooling effect of fuel on engine, and jet settings are made so as to satisfy and balance all of these conditions. Therefore, the jet should not be replaced with a size other than the original. And the positions of adjustable parts should not be changed except when compensation for the mixture ratio due to altitude differences or other climatic conditions. When adjustment is necessary, refer to the following.
Fuel-air mixture ratio can be changed as follows:

<table>
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<th>Throttle opening</th>
<th>Means of changing ratio</th>
<th>Standard setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>slight</td>
<td>pilot jet</td>
<td>657.5</td>
</tr>
<tr>
<td></td>
<td>larger number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>richer mixture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>smaller number -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>leaner mixture</td>
<td></td>
</tr>
</tbody>
</table>

Jet needle

- 1st
- leaner
- richer
- 5th
- 3rd groove

Main jet

- larger number
- richer mixture
- smaller number
- leaner mixture

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Fuel is being supplied to the carburetor from fuel tank by controlled fuel cock assy. Air filter box is fitted on the left side of the motorcycle. Fuel gets atomized and mixes with clean air in right proportion in the carburetor and then air fuel mixture is supplied to the combustion chamber of the engine. In engine this air fuel mixture is controlled by the intake valve and camshaft rocker arm mechanism.

![Air-Fuel Flow Chart]

1) Air-Fuel Flow Chart

- **Air**: Atmosphere → Air cleaner assy → Filters → Fuel Tap → Venturi Inlet → Venturi outlet → Combustion chamber
- **Fuel**: Fuel tank → Strainer fuel cock → Sedimentation bowl → Filter → Floater Chamber → Diffuser of Jet → Venturi outlet
AIR FUEL MIXTURE RATIO

1. Starting ............................. 7~8: 1
2. Idling speed .......................... 10~12: 1
3. Slow speed ........................... 12~14: 1
4. Medium speed ........................ 15~17: 1
5. High speed ........................... 13~15: 1

CARBURETTOR CIRCUITS:

ZIP r3i CARBURETOR HAS FOLLOWING 6 MAIN CIRCUITS

1. Fuel Intake circuit
2. Choke circuit
3. Idling speed circuit
4. Slow speed circuit
5. Medium speed circuit
6. Highspeed circuit
1. **FUEL INTAKE CIRCUIT:**

From fuel tank fuel comes into float chamber of carburetor by controlled fuel cock assy. Separate vent is provided at LH side of carburetor body to maintain inside atmospheric pressure. When fuel starts filling the float chamber, float rises up words along with the float pin and after a certain level it stops further flow of fuel.

2. **CHOKE CIRCUIT:**

Choke is provided for easy starting, since it requires rich mixture. Hence choke knob is being operated from the carburetor. Due to this an air stopper (Butterfly valve) comes on the way to the venturi (Air filter side) of the carburetor, thus reducing the amount of air being mixed with fuel. Excessive fuel is being sucked from the slow jet and less quantity of air enters from the choke valve and from the small opening below the throttle valve.

When the motorcycle engine starts, a spring loaded window is provided in the choke actuating lever itself so as provide in the choke actuating knob itself so as provide extra air as required to run the engine in rich mixture.
3. **IDLING CIRCUIT:**

After starting operation choke is released, more air starts flowing thru the venturi. From slow jet fuel is sucked due to venturi effect. A separate passage from the air filter side is coming at the diffuser of the slow jet for the atomization of fuel in slow jet. This atomized fuel is sucked into the venturi as started above from the slow jet (As shown in figure). The amount of air for atomization is regulated by airscrew located at bottom side of the carburetor body.

4. **SLOW SPEEDCIRCUIT**

Slow speed requires very less acceleration. Air fuel mixture is being supplied by slow jet and also from main jet. This is due to partial opening of throttle valve, lifts needle jet upwards. Hence some quantity of air fuel mixture coming out from main jet diffuser also mixes along with slow jet mixture to increase the mixture quantity as required by engine.

5. **MEDIUM SPEED CIRCUIT**

(Economy speed range)

Further acceleration the air fuel mixture supplied to engine only from main jet. During this slow jet stops supplying air fuel mixture due to venturi effect. Hence air is drawn to main jet through metered air jet (Brass tube) for better mixing of fuel with air in the main jet diffuser. Main jet started supplying air fuel mixture in economy range i.e. more air with less quantity of fuel as per engine requirement.
1. **HIGH SPEED CIRCUIT**
   During acceleration the throttle valve (piston) is fully raised, more air is being supplied due to higher velocity. Hence pressure drops at the opening of throttle jet needle. Where as more fuel is sucked from the main jet due to tapperness of jet needle. A jet holder is provided to the main jet to avoid fuel flow strain (turbulence) effect in the float chamber created during the very high speed to diffuser (As shown in the figure)

---

**CARBURETOR**

**CARBURETTOR REMOVAL/INSTALLATION FROM MOTORCYCLE REMOVAL:**
1. Turn fuel switch "OFF" position.
2. Disconnect fuel pipe from carburetor by pressing clip.
3. Loosen the clamp over air cleaner connecting tube (Air duct).
4. Drain the fuel from carburetor float chamber in a separate pan loosening drains screw.
5. Remove insulator clamp screw.
6. Pull out the carburetor assy. Along with insulator from air duct.
7. Open the carburetor top cap, pull out the throttle valve along with needle, clip, and spring & throttle cable.
8. Remove the overflow/drain pipe.

**INSTALLATION:**

FOLLOW THE REVERSE ORDER OF REMOVAL

**NOTE:**
- After installation check for any fuel leakage from the carburetor or fuel line.
- Check for the throttle smooth movement; if necessary adjust throttle grip free play 3 to 6 mm.
CARBURETTER ASSEMBLY

DISASSEMBLY PROCEDURE FOR CARBURETTER CLEANING:
- Remove the throttle valve from the accelerator cable by compressing the spring up from the seat in long slit. Remove the tip of the cable from the slot of the valve.
- Remove the jet needle from the throttle valve along with clip and plate.
- Remove the airscrew with spring.
- Remove the Idling screw with spring.
- Remove the float chamber by unscrewing three screws.
- Pull out the float arm pin to remove the float.
- Remove the main jet along with jet holder and needle.
- Remove the slow jet.
- Now clean all the carburetor components and apply compressed dry air in all passages (galleries)

NOTE:
- Don’t remove clip from the jet needle groove.
- Ensure that float and float valve is being removed before carrying out any other jobs on carburetor. So that these components will not get damage.

ASSEMBLY PROCEDURE OF CARBURETTER:
- Screw the slow jet (Ensure that all holes are clearly visible on the slow jet body).
- Fix needle jet from main jet hole (Ensure that the smaller dial faces towards carburetor body hole).
- Tighten the needle jet holder (Ensure that all holes clearly visible on the needle jet holder body).
- Screw the main jet along with jet holder.
- Insert the float arm pin through the pivot and the float.
- Check float height (Specified 13±1mm) adjust, if necessary this will avoid overflow.
- Fix the float chamber.
- Fix idle screw and airscrew along with spring (Initial airscrew setting one and half turn out).
- Insert the jet needle along with clip and plate into the throttle valve (Ensure that needle lock clip is in 3rd groove position from top).
- Connect the throttle valve to the accelerator cable first compress the spring into the cap. Insert the tip of the cable through the slot in the throttle valve base and fix cable in long slit rest position.
- Align the groove on the side of the throttle valve with the guide pin in the carburetor body. Check for its smooth movement.
- Tighten the top cap over carburetor body.
CARBURETTOR TUNING OR ADJUSTMENT PROCEDURE

After installation the carburetor in the engine as per above said procedure, follow the following steps:

- Warming up the engine to the normal running temperature.
- Adjust Idling speed to 1800±100 RPM by throttle stop (Idle) screw.
- Turn the air screw all the way inside until seats lightly in the carburetor body.
- If engine stops then... OK (In case does not stop, check for air leakage from insulator “O” ring and rectify).
- Readjust air screw position to $\frac{1}{2} \pm \frac{1}{2}$ turns out.
- Start the engine and increase the Idling speed by turning the Idle (stop) screw in anticlockwise direction, till the engine speed increases to the range of 2000 to 2500 RPM.
- Open the air screw outwards (anticlockwise) slowly till engine RPM increases to the peak/highest speed position while setting. Now stop adjusting air screw (Maximum recommended air screw opening position 1½ turns out).
- Readjust Idling speed to 1800±100 RPM by the throttle stop screw & ensure that exhaust emission Carbon Monoxide CO % 1.5 to 2.0 %.
- After adjusting Idling speed, check for its stability/flat spot/missing if any, by accelerating few times. Repeat above said steps until engine speed increases smoothly.

NOTE:

- Do not apply force or over tight the air screw. Damage may occur incase the air screw is being tightened against the air screw seat.
- Incase the Idling speed is too low engine will stop; if it is too high will cause fuel consumption.

WARNING

While running engine in Idling speed turn the handle bar to the extreme left or right hand side, if any change in idling speed noticed, the accelerator cable may be wrongly routed or improperly adjusted. Correct the same before test ride.
Article II.  

CHAPTER 5

Article III.  ELECTRICAL SYSTEM

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- INDICATOR ....................................................57
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IGNITION SYSTEM

The ignition system consists of a flywheel magneto, a CDI and Ignition coil unit and a spark plug. ① As the rotor generates, an AC current is induced in the coil. Then current induced in the A direction charges up the capacitor.

② As the rotor rotates further, the current are induced in the reverse direction. The current causes a voltage applied through the ground to the gate of SCR. ③ As the SCR conducts, the energy, which has been charged in the capacitor, is instantaneously discharged through the primary winding of the ignition coil.

CDI UNIT AND IGNITION COIL INSPECTION

CHECKING WITH ELECTRO TESTER

Connect the CDI test lead to the coil's primary connector.

Connect the high-tension leads, red + lead to the spark plug cord and the black – lead to the black lead of the test lead.

- Set the test selector knob to “P.E.I”.
- Connect the power lead to the appropriate AC source.
- Switch the power on.
NOTE:

The spark in the spark gap window should be strong and continuous, not intermittent, across a preset 8mm(0.32in) gap. Allow the spark to jump the test gap for at least five minutes continuously. To insure proper operation under the temperature of actual riding.

MAGNETO EXCITING COIL

- Remove the right frame side cover.
- Disconnect the exciting coil lead wire (black with red tracer).
- Using a Multimeter, measure the resistance between the B/R lead wire and ground. If the resistance checked is incorrect, replace the coil.

*Exciting coil resistance: 140-220Ω*
The charging system uses the flywheel magneto shown in the figure. The charging and lighting coils are mounted on the magneto stator and generate AC as the flywheel rotor turns. AC generated in the charging coil flows to the regulator/rectifier, which changes AC to DC. The DC then charges the battery.

On the other hand, lighting coil supplies AC current to the headlight, taillight, and meter light under the regulated condition.
**CHARGING OUTPUT CHECKING:**

Start the engine and keep it running at 5000 RPM with light switch turned on condition.

**NOTE:**
When making the test, be sure that the battery is fully charged condition.

**Digital Tachometer:** For measuring engine RPM

**Specified charging output Voltage:** 12~14 Volt at 5000 RPM
**NO-LOAD PERFORMANCE**

- Disconnect the magneto lead wire coupler.
- Start the engine and keep it running at 5000 RPM.
- Using a Multimeter, measure the AC voltage between the white and red tracer lead wire and ground. If the tester reading is as follows, magneto is in good condition.

*Specified no-load Voltage:*

*More than 65 Volt (AC) AT 5000 RPM.*

**STATOR COILS RESISTANCE VALUE**

<table>
<thead>
<tr>
<th>Coil Description</th>
<th>Resistance Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging Coil</td>
<td>285 to 375 Ω</td>
</tr>
<tr>
<td>Pick-up Coil</td>
<td>120±20 Ω at 20°C</td>
</tr>
<tr>
<td>Light Coil</td>
<td>Less than 2 Ω</td>
</tr>
<tr>
<td>Battery Charging Coil</td>
<td>Less than 2 Ω</td>
</tr>
</tbody>
</table>

Use Multimeter tester to measure the resistance between the lead wire and ground. If the checked resistance is incorrect, replace the coil.

*Regulator / rectifier*

Disconnect the lead wire coupler.

Using the Multimeter (×1 Ω Range), measure the resistance between the terminals as shown in the following table. If the resistance checked is incorrect, replace the regulator/rectifier.

**UNIT: Ω**
**STARTER SYSTEM DESCRIPTION**

The starter system is shown in the diagram below namely, the Starter Motor, Relay, Starter switch and Battery. Depressing the starter button while squeezing the front or rear brake lever energizes the relay, causing the contact points to close, which connects the starter motor to the battery.

---

**Starter motor removal and disassembly:**
Remove the starter motor; disassemble the starter motor as shown in the illustration
**STARTER MOTOR INSPECTION**

**CARBON BRUSHES**

When the brushes are worn, the motor will be unable to produce sufficient torque, and the engine will be difficult to turn over. To prevent this, periodically inspect the length of the brushes and replace them when they are too short or chipping.

*Service Limit: 3.5mm (0.14in)*

**Commutator**

If the commutator surface is dirty, starting performance will decrease. Polish the commutator with #400 or similar fine emery paper when it is dirty.

*Service Limit: 0.2mm (0.008in)*
**ARMATURE COIL**

Using the Multimeter, check the coil for open and ground by placing probe pins on each commutator segment and rotor core and on any two segments at various places. With the brushes lifted off the commutator surface. If the coil is found open-circuited or grounded, replace the armature.

---

**STARTER RELAY INSPECTION**

- Disconnect lead wire (R/W) of the starter motor. Turn on the ignition switch and squeeze the front or rear brake lever, and then inspect the continuity between the Red and Red/White lead wires at the starter relay when pushing the starter button.
  
  If the starter relay is in sound condition, continuity is found.

- Disconnect the starter relay lead wire coupler. Check the coil for “open”, “ground” and ohmic resistance. The coil is in good condition, if the resistance is as follows:

  **STANDARD RESISTANCE:** 80~150 Ω
**FUEL LEVEL GAUGE**

**INSPECTION OF FUEL LEVEL GAUGE**

The two different checks to be used for inspection of fuel level gauge.
The first and simplest test will tell if the meter is operating but will not indicate the meters accuracy throughout the range. To perform the test, lift the seat and remove the Right frame cover, then disconnect the B/W and Y/B lead Connector of the fuel gauge-sending unit. Connect a jumper Wire between B/M and Y/B wires coming from the main wiring harness, the ignition switched ON, the fuel meter should indicate “F”.
The second test will check the accuracy of the meter in the full and empty positions. Connect a 90-ohm resistor between the Y/B and B/W lead wires. The fuel meter is normal if it's pointer indicates the E (empty) position when the specified voltage is applied to the circuit and if it's pointer indicates the F (full) position when the resistor is changed to 10 ohms. If either one or both indications are abnormal, replace the fuel gauge with a new one.

**FUEL GAUGE SENDING UNIT INSPECTION**
Disconnect the lead wires coming out of the fuel gauge and check resistance of each position. If the resistance measured is incorrect, replace the fuel gauge assembly with a new one.

**Resistance is shown in the following table:**

<table>
<thead>
<tr>
<th>FLOAT POSITION</th>
<th>RESISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>F (FULL)</td>
<td>Approx.33 Ω</td>
</tr>
<tr>
<td>(HALF)</td>
<td>Approx.200 Ω</td>
</tr>
<tr>
<td>E (EMPTY)</td>
<td>Approx.300 Ω</td>
</tr>
</tbody>
</table>

**OIL LEVEL SWITCH INSPECTION**
Check the oil level switch for continuity between the lead wires. If the tester does not show the value of 1 ohm when the switch ring is in bottom position, file the contact surface or replace the unit.
**SIGNAL SYSTEM:**
The same bulb is used for both oil levels check light and turn signal indicator light. The circuit diagram is shown below. When the oil level has fallen to a certain level (the remaining amount of oil has become approximately 160 ml, the oil level check light turns on and remains lit. When the turn signal switch is turned on and the turn signal light flashes, the turn signal indicator light (oil level check light) also flashes, both being not concurrently but alternatively as one being lit while the other unit. (pl refer electric diagram below)
SWITCHES

<table>
<thead>
<tr>
<th>MAIN SWITCH</th>
<th>NADRAL SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>R/W</td>
</tr>
<tr>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>LOCK</td>
<td></td>
</tr>
<tr>
<td>GRAY</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FRONT/REAR BRAKE LIGHT SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/W</td>
</tr>
<tr>
<td>ON</td>
</tr>
<tr>
<td>OFF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRANS-LIGHT SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
</tr>
<tr>
<td>High beam</td>
</tr>
<tr>
<td>Low beam</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRANS-DIRECTION SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
</tr>
<tr>
<td>L</td>
</tr>
<tr>
<td>R</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STERIAR SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>G/Y</td>
</tr>
<tr>
<td>ON</td>
</tr>
<tr>
<td>OFF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LIGHTING SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>G/R</td>
</tr>
<tr>
<td>OFF</td>
</tr>
<tr>
<td>High beam</td>
</tr>
<tr>
<td>Headlight</td>
</tr>
</tbody>
</table>

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type designation</th>
<th>YUASA/YB4L-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>12V-4Ah</td>
</tr>
</tbody>
</table>

Specific gravity (Fully charged) Needs Charging
1.24~1.28 at 27°C Below 1.220

INITIAL CHARGING
FILLING ELECTROLYTE
Remove the aluminum tape sealing the battery electrolyte filler holes.
**BATTERY**

- Open the battery cap ①

- Remove the electrolyte cap ②.

**NOTE:**
- After filling the electrolyte completely, use the removed Cap ② as the sealed caps of battery-filler holes.

- Do not remove or pierce the sealed areas ③ of the electrolyte container.

- Insert the nozzles of the electrolyte container into the Battery’s electrolyte filler holes, holding the container firmly so that it does not fall. Take precaution not to allow any of the fluid to spill.

- Make sure air bubbles are coming up each electrolyte container, and leave in the position for about more than 20 minutes.

**NOTE:**
*If no air bubbles are coming up from a filter port, tap the bottom of the two or three times. Never remove the container from the battery.*
After confirming that the electrolyte has entered into the battery completely, remove the electrolyte containers from the battery, wait for around 25 minuets.

Insert the caps into the filler holes, pressing in firmly so that the top of the caps does not protrude above the upper surface of the battery’s top cover.

**CAUTION:**
- Always use specified things of the battery.
- Once install the caps to the battery; do not remove the caps.

- Check battery voltage by multimeter if battery voltage less than the specified voltage (12.5~12.6 Volt). Charge the battery with a battery charger.

**SERVICING:**
Visually inspect the surface of the battery container. If any sign of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one. If the battery terminals are found to be coated with rust or an acidic white powdery substance, then this can be cleaned away with sandpaper.

**RECHARGING OPERATION**
Apply multimeter to measure the voltage of battery. If the reading is below 12.0V, it should be recharge with a battery charger.

**NOTE:** When recharging, remove the battery form the vehicle.

**NOTE:** When recharging, don’t remove the sealing caps from the battery.

**Recharging Current & Time:**

<table>
<thead>
<tr>
<th>Charging Current</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4Amp</td>
<td>5 hours</td>
</tr>
<tr>
<td>OR 4.0Amp</td>
<td>1 hour</td>
</tr>
<tr>
<td>charging</td>
<td>for quick</td>
</tr>
<tr>
<td>charging</td>
<td>operation</td>
</tr>
</tbody>
</table>

**NOTE 1** The charging current should be not more than 4Amp at any time.

**NOTE 2**. Quick charging of battery will reduce the battery life.

**CAUTION:**
- After recharging, wait for more than 30 minutes and re-check battery voltage by multimeter.
- If the battery voltage is less than 12.5 Volt, please recharge the battery again.
- If battery voltage is still less than 12.5Volt, please replace the battery with a new one.
- When the motorcycle is not used for a long period, check the battery every one-month to prevent the battery discharge.
CHAPTER 6
SERVICING INFORMATION

Contents

- Troubleshooting .................................................................63
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- Battery...............................................................................67
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- Special tools.........................................................................75
- Thread parts tightening torque......................................77
- Service data.........................................................................78
## TROUBLE SHOOTING

### ENGINE

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Symptom and possible causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine does not start, or is hard to start.</td>
<td>Compression too low</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Excessively worn cylinder or piston rings.</td>
<td>Replace.</td>
</tr>
<tr>
<td>2.</td>
<td>Stiff piston ring in place.</td>
<td>Repair or replace.</td>
</tr>
<tr>
<td>3.</td>
<td>Gas leaks from the joint in crankcase, cylinder or cylinder head.</td>
<td>Repair or replace.</td>
</tr>
<tr>
<td>5.</td>
<td>Spark plug too loose.</td>
<td>Tighten</td>
</tr>
<tr>
<td>Plug not sparking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Damaged spark plug or spark plug cap.</td>
<td>Replace.</td>
</tr>
<tr>
<td>2.</td>
<td>Dirty or wet spark plug.</td>
<td>Clean and dry.</td>
</tr>
<tr>
<td>3.</td>
<td>Defective CDI &amp; ignition coil unit or stator coil.</td>
<td>Replace.</td>
</tr>
<tr>
<td>4.</td>
<td>Open or shorten high-tension cord.</td>
<td>Replace.</td>
</tr>
<tr>
<td>No fuel reaching the carburetor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Clogged or defective fuel cock.</td>
<td>Clean or replace.</td>
</tr>
<tr>
<td>3.</td>
<td>Defective carburetor float valve.</td>
<td>Replace.</td>
</tr>
<tr>
<td>4.</td>
<td>Clogged fuel hose or defective vacuum hose.</td>
<td>Clean or replace.</td>
</tr>
<tr>
<td>Engine stalls easily.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Defective CDI &amp; ignition coil unit.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Noisy engine.</td>
<td>Noise appears to come from piston</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Piston or cylinder worn down.</td>
<td>Replace.</td>
</tr>
<tr>
<td>3.</td>
<td>Piston pin, bearing or piston pin bore worn.</td>
<td>Replace.</td>
</tr>
<tr>
<td>4.</td>
<td>Piston rings or ring grooves worn.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Noise seems to come from crankshaft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Worn or burnt crankshaft bearings.</td>
<td>Replace.</td>
</tr>
<tr>
<td>2.</td>
<td>Worn or burnt conrod big-end bearings.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Section 3.02 Noise seems to come from final gear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Gears worn or rubbing.</td>
<td>Replace.</td>
</tr>
<tr>
<td>2.</td>
<td>Badly worn splines.</td>
<td>Replace.</td>
</tr>
<tr>
<td>3.</td>
<td>Worn or damaged bearing of drive shaft or rear axle shaft.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Slipping clutch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Worn or damaged clutch shoes.</td>
<td>Replace.</td>
</tr>
<tr>
<td>2.</td>
<td>Worn clutch drum.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Complaint</td>
<td>Symptom and possible causes</td>
<td>Remedy</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Dirty or heavy exhaust smoke.</td>
<td>1. Too much engine oil into the engine. 2. Use of incorrect engine oil.</td>
<td>Check oil pump. Change.</td>
</tr>
</tbody>
</table>
### Section 3.03 CARBURETOR

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Symptom and possible causes</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| **Trouble with starting.** | 1. Starter jet is clogged.  
2. Air leaking from a joint between starter body and carburetor.  
3. Air leaking from carburetor's joint's or vacuumed hose joint.  
4. Starter plunger is not operating properly. | Clean.  
Check starter body and carburetor for tightness, and replace gasket.  
Check and replace.  
Check and replace. |
| **Idling or low-speed troubles.** | 1. Pilot jet, pilot air jet is clogged or loose.  
2. Air leaking from carburetor's joint, vacuum pipe joint, or starter.  
3. Pilot outlet is clogged.  
4. Starter plunger is not fully close. | Check and clean.  
Check and replace. |

<table>
<thead>
<tr>
<th>1) Complaint</th>
<th>2) Symptom and possible causes</th>
<th>3) Remedy</th>
</tr>
</thead>
</table>
| **Medium- or high-speed trouble.** | 1. Main jet or main air jet is clogged.  
2. Needle jet is clogged.  
3. Fuel level is improperly set.  
4. Throttle valve is not operating properly.  
5. Fuel filter is clogged. | Check and clean.  
Check and clean.  
Check and replace.  
Check throttle valve for operation.  
Check and clean. |
| **Overflow and fuel level fluctuations.** | 1. Needle valve is worn or damaged.  
2. Spring in needle valve is broken.  
3. Float is not working properly.  
4. Foreign matter has adhered to needle valve.  
5. Fuel level is too high or low. | Replace.  
Replace.  
Check and adjust.  
Clean.  
Adjust and replace. |

### ELECTRICAL

<table>
<thead>
<tr>
<th>4) Complaint</th>
<th>5) Symptom and possible causes</th>
<th>6) Remedy</th>
</tr>
</thead>
</table>
| **No sparking or poor sparking.** | 1. Defective CDI & ignition coil unit.  
2. Defective spark plug.  
3. Defective magneto stator coil.  
4. Loose connection of lead wire. | Replace.  
Replace.  
Replace.  
Connect/tighten. |
| **Spark plug soon becomes fouled with carbon.** | 1. Mixture too rich.  
2. Idling speed set too high.  
3. Incorrect gasoline.  
4. Dirty element in air cleaner.  
5. Spark plug loose.  
Adjust carburetor.  
Change.  
Clean.  
Replace by hot type plug.  
Replace. |
### Spark plug electrodes overheat or burn.

1. Spark plug too hot.
2. The engine overheats.
4. Mixture too lean.
5. Not enough engine oil.

**Remedy**
- Replace by cold type plug.
- Tune up.
- Retighten.
- Adjust carburetor.
- Check oil pump.

### Magneto does not charge.

1. Open or short in lead wires, or loose lead connections.
2. Shorted, grounded or open magneto coil.
3. Shorted or open regulator/rectifier.

**Remedy**
- Repair or retighten.
- Replace.
- Replace.

### Magneto charge, but charging rate is below the specifications.

1. Lead wires tend to get shorted or open-circuited or loosely connected at terminal.
2. Grounded or open-circuited stator coils of magneto.
3. Defective regulator/rectifier.
4. Defective cell plates in the battery.

**Remedy**
- Repair or retighten.
- Replace.
- Replace.
- Replace the battery.

<table>
<thead>
<tr>
<th>Complaint</th>
<th>7) Symptom and possible causes</th>
<th>(ii) Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstable charging.</td>
<td>1. Defective regulator/rectifier.</td>
<td>Repair or replace.</td>
</tr>
<tr>
<td></td>
<td>2. Lead wire insulation frayed due to vibration, resulting in intermittent shorting.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>3. Magneto coil internally shorted.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b)</td>
<td>(i) Replace.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starter button is not effective.</td>
<td>1. Battery runs down.</td>
<td>Recharge and replace.</td>
</tr>
<tr>
<td></td>
<td>2. Defective switch contacts.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>3. Brushes not seating properly on commutator in starter motor.</td>
<td>Repair or replace.</td>
</tr>
<tr>
<td></td>
<td>5. Defective starter pinion gears</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>6. Defective front or rear brake light switches circuit.</td>
<td>Repair or replace.</td>
</tr>
<tr>
<td>Magneto overcharges.</td>
<td>1. Internal short-circuit in the battery.</td>
<td>Replace the battery.</td>
</tr>
<tr>
<td></td>
<td>2. Resistor element in the regulator/rectifier damaged or defective.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>3. Regulator/rectifier unit poorly grounded.</td>
<td>Clean and tighten ground connection.</td>
</tr>
</tbody>
</table>
### BATTERY

<table>
<thead>
<tr>
<th>Complaint</th>
<th>(c) Symptom and possible causes</th>
<th>(i) Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery runs down quickly.</td>
<td>1. The charging method is not correct.</td>
<td>Check the magneto and regulator/rectifier circuit connections, and make necessary adjustments to obtain specified charging operation. Replace the battery, and correct the charging system.</td>
</tr>
<tr>
<td></td>
<td>2. Cell plates have lost much of their active material as a result of over-charging.</td>
<td>Replace the battery.</td>
</tr>
<tr>
<td></td>
<td>3. A short-circuit condition exists within the battery due to excessive accumulation of sediments caused by the incorrect electrolyte.</td>
<td>Replace the battery.</td>
</tr>
<tr>
<td></td>
<td>4. Battery is too old.</td>
<td></td>
</tr>
<tr>
<td>Reversed battery polarity.</td>
<td>1. The battery has been connected the wrong way round in the system, so that it is being charged in the reverse direction.</td>
<td>Replace the battery and be sure to connect the battery properly.</td>
</tr>
<tr>
<td>Battery discharges too rapidly.</td>
<td>1. Dirty container top and sides.  2. Battery is too old.</td>
<td>Clean. Replace.</td>
</tr>
</tbody>
</table>

### CHASSIS

<table>
<thead>
<tr>
<th>Complaint</th>
<th>(d) Symptom and possible causes</th>
<th>(i) Remedy</th>
</tr>
</thead>
</table>
| Handling feels too heavy.                      | 1. Steering stem nut over tightened.  
2. Broken bearing/race in steering stem.  
3. Distorted steering stem.  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wobbly handle.</td>
<td>1. Loss of balance between right and left front suspension. Replace. Replace.</td>
</tr>
</tbody>
</table>
2. Distorted front axle or crooked tire.       |                                                                                  |
2. Worn front wheel bearings. Replace. Replace. Replace. |
3. Defective or incorrect tire. Replace. Replace. Replace. |
7. Loose nuts or bolts for engine mounting. Replace. Replace. Replace. |
2. Oil leakage of shock absorber,              |                                                                                  |
| Front suspension too stiff.                   | 1. Not enough grease, Replace. Replace. Replace. |
2. Worn suspension arm spacer Replace. Replace. |                                                                                  |
<table>
<thead>
<tr>
<th>Complaint</th>
<th>1) Symptom and possible causes</th>
<th>2) Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noisy front suspension.</td>
<td>1. Not enough grease.</td>
<td>Refill.</td>
</tr>
<tr>
<td></td>
<td>2. Loose nuts on suspension.</td>
<td>Retighten.</td>
</tr>
<tr>
<td>Wobbly rear wheel.</td>
<td>1. Distorted wheel rim.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>2. Defective or incorrect tire.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>3. Loose nuts on the rear shock absorber.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>5. Loose nuts or bolts for engine mounting.</td>
<td>Retighten.</td>
</tr>
<tr>
<td>Rear suspension too soft.</td>
<td>1. Weakened spring.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>2. Oil leakage of rear shock absorber.</td>
<td>Add lubrication</td>
</tr>
<tr>
<td>Noisy rear suspension.</td>
<td>1. Loose nuts on shock absorber,</td>
<td>Adjust</td>
</tr>
<tr>
<td></td>
<td>2. Lubrication leakage.</td>
<td>Add lubrication</td>
</tr>
</tbody>
</table>

(ii) BRAKES

<table>
<thead>
<tr>
<th>Complaint</th>
<th>1) Symptom and possible causes</th>
<th>2) Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient brake power.</td>
<td>1. Leakage of brake fluid from hydraulic system.</td>
<td>Repair or replace.</td>
</tr>
<tr>
<td></td>
<td>2. Worn pad.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>3. Oil adhesion on engaging surface of pad.</td>
<td>Clean disc and pads.</td>
</tr>
<tr>
<td></td>
<td>5. Air entered into hydraulic system.</td>
<td>Bleed air.</td>
</tr>
<tr>
<td></td>
<td>7. Friction surfaces of shoes are dirty with oil.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>2. Tilted pad.</td>
<td>Modify and fitting.</td>
</tr>
<tr>
<td></td>
<td>3. Damaged wheel bearing.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>5. Foreign substance entered into brake fluid.</td>
<td>Replace brake fluid.</td>
</tr>
<tr>
<td></td>
<td>7. Brake shoe surface glazed.</td>
<td>Repair surface with sandpaper,</td>
</tr>
<tr>
<td></td>
<td>8. Loose front-wheel axle or rear-wheel axle nut.</td>
<td>Tighten to specified torque.</td>
</tr>
<tr>
<td>Excessive brake lever stroke.</td>
<td>1. Air entered into hydraulic system.</td>
<td>Adjust</td>
</tr>
<tr>
<td></td>
<td>2. Insufficient brake fluid.</td>
<td>Refill</td>
</tr>
<tr>
<td></td>
<td>3. Improper quality of brake fluid.</td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>4. Worn brake cam lever.</td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>5. Excessively worn shoes and/or drum.</td>
<td>Replace</td>
</tr>
<tr>
<td>Leakage of brake fluid.</td>
<td>1. Insufficient tightening of connection joints.</td>
<td>Replace or repair</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>2. Cracked hose.</td>
<td>Replace.</td>
</tr>
<tr>
<td>Brake drags.</td>
<td>1. Rusty moving parts.</td>
<td>Replace</td>
</tr>
</tbody>
</table>
Starting relay

Ignition coil

CDI

HORN
### SPECIAL TOOLS LISTED BELOW FOR REMOVAL AND REINSTALLATION

<table>
<thead>
<tr>
<th>NO.</th>
<th>TOOL NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T01</td>
<td>&quot;T&quot;shape of sleeve</td>
</tr>
<tr>
<td>2</td>
<td>T02</td>
<td>Sleeve tools (7mm, 8mm, 10mm, 12mm, 13mm)</td>
</tr>
<tr>
<td>3</td>
<td>T03</td>
<td>Flywheel remover</td>
</tr>
<tr>
<td>4</td>
<td>T04</td>
<td>Sleeve (18mm, 24mm)</td>
</tr>
<tr>
<td>5</td>
<td>T05</td>
<td>Screw remover</td>
</tr>
<tr>
<td>6</td>
<td>T06</td>
<td>Cylinder pressure gauge</td>
</tr>
<tr>
<td>7</td>
<td>T07</td>
<td>Piston pin remover</td>
</tr>
<tr>
<td>8</td>
<td>T08</td>
<td>Spark plug remover</td>
</tr>
<tr>
<td>9</td>
<td>T10</td>
<td>Flywheel lock bolt remover</td>
</tr>
<tr>
<td>10</td>
<td>T11</td>
<td>Clutch clamp</td>
</tr>
</tbody>
</table>

![Diagram](image1)

1. T01 - "T"shape of sleeve
2. T02 - Sleeve tools (7mm, 8mm, 10mm, 12mm, 13mm)
3. T06 - Cylinder pressure gauge
### TIGHTENING TORQUE OF SCREW THREAD PARTS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder guide cover tapping screw</td>
<td>1-4</td>
<td></td>
</tr>
<tr>
<td>Fan guide cover lock bolt</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Cylinder cover locknut</td>
<td>15-18</td>
<td></td>
</tr>
<tr>
<td>Spark plug</td>
<td>15-18</td>
<td></td>
</tr>
<tr>
<td>Inlet pipe lock bolt</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Cooling fan impeller lock screw</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Flywheel lock bolt</td>
<td>45-50</td>
<td></td>
</tr>
<tr>
<td>Magneto stator coil lock screw</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Magneto exciting lock screw</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td>Oil pump lock screw</td>
<td>5-9</td>
<td></td>
</tr>
<tr>
<td>Right crankcase lock bolt</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Bearing press board lock bolt</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Cylinder double head bolt</td>
<td>15-18</td>
<td></td>
</tr>
<tr>
<td>Motor tightening bolt</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Left crankcase cover lock screw</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Left crankcase cover lock bolt</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Main drive wheel face locknut</td>
<td>35-38</td>
<td></td>
</tr>
<tr>
<td>Driven wheel face locknut</td>
<td>35-38</td>
<td></td>
</tr>
<tr>
<td>Driven wheel face clutch locknut</td>
<td>55-60</td>
<td></td>
</tr>
<tr>
<td>Exceeding clutch outside lock screw</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Electrical start idle press board screw</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Gear case lock bolt</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Left crankcase discharging oil hole lock bolt</td>
<td>22-25</td>
<td></td>
</tr>
<tr>
<td>Left crankcase positioning pin shaft locknut</td>
<td>18-22</td>
<td></td>
</tr>
</tbody>
</table>
## SERVICING DATA

### CYLINDER+PISTON+PISTON RING

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>STANDARD</th>
<th>TOLERANCE mm( in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piston to cylinder clearance</td>
<td>0.06-0.07 (0.0024-0.0028)</td>
<td>0.120 (0.0047)</td>
</tr>
<tr>
<td>Cylinder bore</td>
<td>40.005-40.020 (1.5750-1.5756)</td>
<td>40.075 (1.5778)</td>
</tr>
<tr>
<td>Piston diameter</td>
<td>39.94-39.955 (1.5724-1.5746)</td>
<td>39.885 (1.5703)</td>
</tr>
<tr>
<td>Cylinder distortion</td>
<td></td>
<td>0.04 (0.0016)</td>
</tr>
<tr>
<td>Cylinder head distortion</td>
<td></td>
<td>0.04 (0.0016)</td>
</tr>
<tr>
<td>Piston ring free cotter end clearance 1st ring</td>
<td>0.02~0.06mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2en ring</td>
<td>0.02~0.06mm</td>
</tr>
<tr>
<td>Piston ring close end clearance</td>
<td>0.15-0.35 (0.0059-0.0138)</td>
<td>0.8 (0.0315)</td>
</tr>
<tr>
<td>Piston ring to groove clearance</td>
<td>1st ring</td>
<td>0.02<del>0.06(0.0008</del>0.0024)</td>
</tr>
<tr>
<td></td>
<td>2en ring</td>
<td>0.02<del>0.06(0.0008</del>0.0024)</td>
</tr>
<tr>
<td>Piston pin bore</td>
<td>10.002-10.008 (0.3938-0.3940)</td>
<td>10.030 (0.3949)</td>
</tr>
<tr>
<td>Piston pin outside diameter</td>
<td>9.994-10.000 (0.3935-0.3937)</td>
<td>9.98 (0.3929)</td>
</tr>
</tbody>
</table>

### CONNECTING ROD+CRANKSHAFT

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>STANDARD</th>
<th>LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conrod small end</td>
<td>13.995-14.006(0.5510-0.5514)</td>
<td>14.040(0.5528)</td>
</tr>
<tr>
<td>Conrod deflection</td>
<td></td>
<td>3.0(0.12)</td>
</tr>
</tbody>
</table>
Conrod web to web width | 38-38.1(1.496-1.500) |
Crankshaft runout | ________ | 0.05(0.002)

**OIL PUMP**

**DESCRIPTION** | **SPECIFICATION**
--- | ---
Pump reduction ratio | 30.000(30/1)
CCI pump discharge ratio(full open) | 1.1-1.3ml/5min(working pressure is 0.06Mpa and rotating speed 118r/min)

**CLUTCH**

**DESCRIPTION** | **STANDARD** mm(in) | **LIMIT** mm(in)
--- | --- | ---
Clutch wheel inner diameter | 112.00-112.15(4.410-4.415) | 112.5(4.429)
Clutch shoe thickness | 1.8(0.071) | 1.2(0.005)
Clutch engagement | 3000±300r/min | 
Clutch closedown | 6000±300r/min | 

**TRANSMISSION SYSTEM (Gear Ratio)**

**DESCRIPTION** | **STANDARD** | **TOLERANCE**
--- | --- | ---
Final reduction ratio | / | /
Gear reduction ratio | / | /
Drive belt width | 16.8-17.2(0.6614-0.6772) | 16.4(0.6457)
Driven face spring free distance | 69(2.72) | 64.5(2.54)

**CARBURETOR**

Manufacturer and type | Side draft
Identification code | PZ19JB
Venturi | 19mm
Main jet size | #80
Pilot jet size | #57.5
Needle position | 3rd groove from top
Idle air adjusting screw | Open 1 $\frac{1}{2}$ $\pm$ $\frac{1}{2}$ turnover(counter clock wise)
Float height | 13±1mm

**ELECTRICAL**

**DESCRIPTION** | **SPECIFICATION** | **NOTE**
--- | --- | ---
Ignition timing | 15° AT 1500RPM |
<table>
<thead>
<tr>
<th>Spark plug</th>
<th>TYPE</th>
<th>NGK/R/BR8HSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAP</td>
<td>0.6<del>0.8mm / 0.020</del>0.028</td>
<td></td>
</tr>
<tr>
<td>Ignition coil resistance</td>
<td>Primary / secondary</td>
<td>0.2Ω<del>0.3Ω / 7KΩ</del>10KΩ</td>
</tr>
<tr>
<td>Plug cap-ground</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** DESCRIPTION ** | ** SPECIFICATION ** | ** NOTE ** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Magneto coil resistance</td>
<td>Lighting</td>
<td>&lt;2Ω</td>
</tr>
<tr>
<td>Charging</td>
<td>&lt;2Ω</td>
<td></td>
</tr>
<tr>
<td>Exciting</td>
<td>200±20Ω at 20℃</td>
<td></td>
</tr>
<tr>
<td>Generator no-load voltage</td>
<td>More than 52 V at 5000r/min</td>
<td></td>
</tr>
<tr>
<td>Regulated voltage</td>
<td>More than 12-14V at 5000r/min</td>
<td></td>
</tr>
</tbody>
</table>

** WATTAGE **

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headlight high beam/12V</td>
<td>35W/35W</td>
</tr>
<tr>
<td>Dipped headlight</td>
<td>12V 35W</td>
</tr>
<tr>
<td>Taillight</td>
<td>12V 21W/5W</td>
</tr>
<tr>
<td>Front turn light</td>
<td>12V 10W</td>
</tr>
<tr>
<td>Rear turn light</td>
<td>12V 10W</td>
</tr>
<tr>
<td>Turning signal indicator light</td>
<td>12V 3W</td>
</tr>
<tr>
<td>High beam indicator light</td>
<td>12V 1.7 W</td>
</tr>
<tr>
<td>Meter indicator light</td>
<td>12V 1.7 W</td>
</tr>
<tr>
<td>Alarm indicator light</td>
<td>Light diode</td>
</tr>
</tbody>
</table>

** Brake and rim **

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake lever play</td>
<td>Rear</td>
<td>15-20mm</td>
</tr>
<tr>
<td>Hub diameter</td>
<td>Rear</td>
<td>φ110 mm</td>
</tr>
<tr>
<td>Brake shoe thickness</td>
<td>Rear</td>
<td>4mm</td>
</tr>
<tr>
<td>Brake disc thickness</td>
<td>front</td>
<td>4.0±0.2</td>
</tr>
<tr>
<td>Tire size</td>
<td>Front/rear</td>
<td>120/70-12 130/70-12</td>
</tr>
<tr>
<td>Tire surface thickness</td>
<td>front/rear</td>
<td>120/130</td>
</tr>
</tbody>
</table>

** SUSPENSION **

<p>| Front shock absorber stroke | 88 mm | Rear shock absorber stroke | 45 mm |</p>
<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel type</td>
<td>Unleaded gasoline 90 or high octane number is recommended.</td>
<td></td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>5.2L</td>
<td></td>
</tr>
<tr>
<td>Gear oil</td>
<td>SAE85/90</td>
<td></td>
</tr>
<tr>
<td>Gear oil capacity</td>
<td>0.10 ±0.01L</td>
<td></td>
</tr>
<tr>
<td>Gear oil change period</td>
<td>2000 Kms</td>
<td></td>
</tr>
<tr>
<td>Engine Oil tank capacity</td>
<td>0.9±0.1L</td>
<td></td>
</tr>
<tr>
<td>Engine oil grade</td>
<td>2 T Oil</td>
<td></td>
</tr>
<tr>
<td>Brake fluid grade</td>
<td>DOT3 or DOT4</td>
<td></td>
</tr>
</tbody>
</table>